

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions and listings of claims in the application. Please amend the claims, as follows:

1-32. (Canceled)

33. (Currently Amended) A method for configuring the radiation characteristics of an antenna, the method comprising the steps of:

including in said antenna a plurality of radiating elements;
associating to each of said radiating elements with at least a respective signal processing chain located in an antenna unit, including in said respective signal processing chain:

~~at least one module for weighting digital signals, capable of applying the at least one module configured to apply to a digital signal at least a respective weighting coefficient to a digital signal, and~~

~~at least one antenna conversion set interposed between said at least one module for weighting digital signals and a respective one of the radiating elements of the antenna, said antenna conversion set being configured to convert between digital signals processed by the at least one module for weighting digital signals and analog signals transmitted and received at a radiating element; operate on digital signals on the side of said respective weighting module and on analogue signals on the side of the antenna element; and~~

receiving, at the antenna unit, information indicating at least one of the weighting coefficients applied by the modules for weighting digital signals;
configuring at least one weighting coefficient in the modules for weighting digital signals based on the information received at the antenna unit; and
~~causing the propagation of a signal distributed on the processing chains associated to said plurality of radiating elements of the antenna by applying respective weighting coefficients to digital signals in each of the at least one module for weighting digital signals, said digital signal weighting modules, said weighting coefficients determining the radiation diagram-characteristics of the antenna.~~

34. (Currently Amended) The method as claimed in claim 33, comprising the step of including in said signal processing chains first and second modules for weighting digital signals as well as first and second antenna conversion sets, said first module for weighting modules-digital signals and first antenna conversion sets-set operating on the a signal propagated towardtransmitted by said radiating elements of the antenna, said second module for weighting modules-digital signals and second antenna conversion sets-set operating on the a signal propagated starting received from said radiating elements of said antenna.

35. (Currently Amended) The method as claimed in claim 34, comprising the step of applying weighting coefficients in to said first weighting modules and to said second weighting modules for weighting digital signals such that the antenna employs the same radiation pattern for signal transmission and reception. weighting coefficients

~~wherein said radiation diagram applied by said antenna to said signal is equal both for the signal propagated toward said antenna and for the signal propagated starting from said antenna.~~

36. (Currently Amended) The method as claimed in claim 34, comprising the step of applying weighing coefficients in ~~to~~ said first weighting modules and to ~~said second weighting modules for~~ weighting digital signals such that the antenna employs different radiation patterns for signal transmission and reception. ~~weighting coefficients wherein said radiation diagram applied by said antenna to said signal is different for the signal propagated toward said antenna and for the signal propagated starting from said antenna.~~

37. (Currently Amended) The method as claimed in claim 33, comprising the step of including in said antenna conversion set at least a ~~conversion function operating component that converts a signal between the-a~~ radio frequency and the-base band.

38. (Currently Amended) The method as claimed in claim 33, comprising the step of including in said antenna conversion set at least a ~~conversion function operating component that converts a signal between the-a~~ radio frequency and the-an intermediate frequency.

39. (Currently Amended) The method as claimed in claim 34, comprising the step of associating ~~to~~ said first and second antenna conversion sets with signal

distribution elements capable of operating both on signals transmitted and received at a
~~signal propagated toward said antenna and on a signal propagated starting from said~~
antenna.

40. (Currently Amended) The method as claimed in claim 39, comprising the step of choosing at least one of said signal distribution elements from ~~the a~~ group of radio frequency duplexers and switches.

41. (Currently Amended) The method as claimed in claim 33, comprising the steps of:

generating a plurality of replications of a signal to be ~~fed toward~~ transmitted by said antenna; and

sending said replications of the signal on respective signal processing chains associated ~~to~~ with said radiating elements of the antenna.

42. (Currently Amended) The method as claimed in claim 33, further comprising: ~~the step of~~
receiving a plurality of signals at the radiating elements of the antenna;
processing each of the plurality of signals received at the radiating elements
using a respective signal processing chain; and
combining the plurality of received signals processed by the signal processing
chains to form a single received signal.

~~collecting the components of a signal received starting from said antenna and distributed on said respective processing chains by forming a single signal from said components.~~

43. (Currently Amended) The method as claimed in claim 33, comprising the steps of:

receiving, at the antenna unit, a signal incorporating in said distributed signal the information indicating at least one of the weighting coefficients; and pertaining to said weighting coefficients; and

extracting, at the antenna unit, said at least one weighting coefficients coefficient from the received signal. starting from said signal in view of their application to said weighting modules.

44. (Currently Amended) The method as claimed in claim 33, comprising the ~~step~~ steps of:

receiving, at the antenna unit, an optical signal; and
converting the received optical signal into an electrical signal capable of being processed by associating to the antenna a module for converting the signal, which propagates on said signal processing chains associated to with said radiating elements of the antenna, between an optical format and an electrical format, so that said signal is capable of being transmitted with respect to said antenna in optical format.

45. (Currently Amended) The method as claimed in claim 44, comprising the step of including in the optical signal propagated in optical format the information indicating at least one of the weighting coefficients. about said weighting coefficients applied to said digital signal weighting modules.

46. (Currently Amended) The method as claimed in claim 33, comprising the step of placing said processing chains associated to said radiating elements of the antenna unit in close proximity to the antenna. itself.

47. (Currently Amended) An antenna with configurable radiation characteristics, the antenna comprising:

a plurality of antenna radiating elements; and

an antenna unit comprising one or more signal processing chains associated to with the plurality of each of said radiating elements, at least a respective signal processing chain, the each signal processing chain in turn comprising:

at least one module for weighting digital signals, the at least one module configured to apply digital signal weighting module capable of applying to a digital signal at least a respective weighting coefficient to a digital signal; and

at least one antenna conversion set interposed between said at least one module for weighting digital signals and a respective one of the radiating elements of the antenna, said antenna conversion set being configured to convert between digital signals processed by the at least one module for weighting digital signals and analog signals transmitted and received at a radiating element; and

an interface configured to receive information indicating at least one of the weighting coefficients applied by the modules for weighting digital signals, wherein the weighting coefficients applied by the modules for weighting digital signals determine the radiation characteristics of the antenna.

~~operate on digital signals on the side of said respective weighting module and on analogue signals on the side of the antenna element, the arrangement being such that the weighting coefficients applied to said digital signal weighting modules determine the radiation diagram of the antenna.~~

48. (Currently Amended) The antenna as claimed in claim 47, wherein said signal processing chains comprise first and second ~~digital signal weighting modules for weighting digital signals~~ as well as first and second antenna conversion sets, said first ~~module for weighting modules digital signals and first antenna conversion sets set~~ operating on a signal propagated toward ~~transmitted by~~ said radiating elements of the antenna, said second ~~module for weighting modules digital signals and second antenna conversion sets set~~ operating on a signal propagated starting ~~received from~~ said radiating elements of said antenna.

49. (Currently Amended) The antenna as claimed in claim 48, wherein the antenna unit further comprises:

comprising at least one weighting control block configured to apply weighting coefficients in to said first and second modules for weighting modules digital signals, such that the antenna employs the same radiation pattern for signal transmission and

~~reception, and said second weighting modules weighting coefficients wherein said radiation diagram applied by said antenna to said signal is equal both for the signal propagated toward said antenna and for the signal propagated starting from said antenna.~~

50. (Currently Amended) The antenna as claimed in claim 48, wherein the antenna unit further comprises:

~~comprising at least one weighting control block configured to apply weighting coefficients in to said first and second modules for weighting modules digital signals, such that the antenna employs different radiation patterns for signal transmission and reception, and said second weighting modules weighting coefficients wherein said radiation diagram applied by said antenna to said signal is different for the signal propagated toward said antenna and for the signal propagated starting from said antenna.~~

51. (Currently Amended) The antenna as claimed in claim 47, wherein said antenna conversion set comprises at least one frequency converter operating that converts a signal between the a radio frequency and the base band.

52. (Currently Amended) The antenna as claimed in claim 47, wherein said antenna conversion set comprises at least one frequency converter that converts a signal operating between the a radio frequency and the an intermediate frequency.

53. (Currently Amended) The antenna as claimed in claim 48, wherein said first and second antenna conversion sets are associated with signal distribution elements capable of operating both on signals transmitted and received at a signal propagated toward said antenna and on a signal propagated starting from said antenna.

54. (Currently Amended) The antenna as claimed in claim 53, wherein at least one of said signal distribution elements are is selected from the a group of radio frequency duplexers and switches.

55. (Currently Amended) The antenna as claimed in claim 47, comprising a distributing element configured to:

generate a plurality of replications of a signal to be fed towardtransmitted by said antenna; and

distribute sending said replications of the signal on respective signal processing chains associated towith said radiating elements of the antenna.

56. (Currently Amended) The antenna as claimed in claim 47, wherein the antenna unit further comprises comprising a collecting at least one element configured to combine a plurality of signals received at the radiating elements and subsequently processed by the signal processing chains, thereby forming a single received signal.

~~collect the component of a signal received starting from said antenna and distributed on said processing chains associated to said radiating elements of the antenna.~~

57. (Currently Amended) The antenna as claimed in claim 47, comprising an extraction module configured to extract said information indicating at least one of the weighting coefficients applied by the modules for weighting digital signals. weighting coefficients in view of the application to said weighting modules starting from said signal.

58. (Currently Amended) The antenna as claimed in claim 47, wherein said processing chains associated to said radiating elements of the antenna unit is are located in close proximity to the antenna. itself.

59. (Currently Amended) An apparatus comprising an The antenna as claimed in claim 47, wherein the antenna unit further comprises: is associated to: an electro-optical converter module configured to convert the an optical signal received at the interface into an electrical signal capable of being processed by, that propagates on said signal processing chains associated to with said radiating elements of the antenna. , between an optical format and an electrical format.

60. (Currently Amended) The apparatus antenna as claimed in claim 59, wherein said electro-optical converter module has is associated therewith with an

extraction module configured to extract said information indicating at least one of the weighting coefficients applied by the modules for weighting digital signals. weighting coefficients in view of the application to said weighting modules starting from said optical signal.

61. (Currently Amended) A radio base station An apparatus comprising an antenna, the antenna comprising: an apparatus as claimed in claim 59, comprising a plurality of antenna radiating elements; and
an antenna unit comprising one or more signal processing chains associated with the plurality of radiating elements, each signal processing chain comprising:
at least one module for weighting digital signals, the at least one module configured to apply at least a weighting coefficient to a digital signal;
at least one antenna conversion set interposed between said at least one module for weighting digital signals and a respective one of the radiating elements of the antenna, said antenna conversion set being configured to convert between digital signals processed by the at least one module for weighting digital signals and analog signals transmitted and received at a radiating element; and
an interface configured to receive information indicating at least one of the weighting coefficients applied by the modules for weighting digital signals, wherein the weighting coefficients applied by the modules for weighting digital signals determine radiation characteristics of the antenna.
~~a control unit and an optical link for the transmission of an optical signal between said control unit and said electro-optical converter module associated to said antenna.~~

62. (Currently Amended) The ~~radio base station apparatus~~ as claimed in claim 61, further comprising:

a control unit and an optical link for the transmission of an optical signal between said control unit and an electro-optical converter module associated with said antenna.
wherein said control unit comprises a function block that is able to generate an information signal and a signal for controlling the radiation diagram of the antenna.

63. (Currently Amended) A telecommunications network comprising at least an antenna, the antenna comprising: as claimed in claim 47.

a plurality of antenna radiating elements; and
an antenna unit comprising one or more signal processing chains associated with the plurality of radiating elements, each signal processing chain comprising:
at least one module for weighting digital signals, the at least one module configured to apply at least a weighting coefficient to a digital signal;
at least one antenna conversion set interposed between said at least one module for weighting digital signals and a respective one of the radiating elements of the antenna, said antenna conversion set being configured to convert between digital signals processed by the at least one module for weighting digital signals and analog signals transmitted and received at a radiating element; and
an interface configured to receive information indicating at least one of the weighting coefficients applied by the modules for weighting digital signals, wherein the

weighting coefficients applied by the modules for weighting digital signals determine radiation characteristics of the antenna.

64. (Currently Amended) A computer-readable medium comprising instructions for execution by a processor, the instructions data processing product capable of being loaded into the memory of at least an electronic device and comprising portions of software codes capable of implementing the_a method as claimed in claim 33. for configuring radiation characteristics of an antenna, the method comprising the steps of:

receiving, at an antenna unit coupled to the antenna, information indicating at least one weighting coefficient to be applied by modules for weighting digital signals located in the antenna unit;

configuring at least one weighting coefficient in the modules for weighting digital signals based on the information received at the antenna unit; and applying respective weighting coefficients to digital signals in each of the modules for weighting digital signals, said weighting coefficients determining the radiation characteristics of the antenna.

Please add the following new claims 65-69:

65. (New) The antenna as claimed in claim 47, wherein the interface is a digital data link.

66. (New) The antenna as claimed in claim 65, wherein the digital data link is an optical fiber.

67. (New) The apparatus as claimed in claim 61, wherein the apparatus is a radio base station.

68. (New) A method for configuring radiation characteristics of an antenna, the method comprising:

receiving, at an antenna unit coupled to the antenna, information indicating at least one weighting coefficient to be applied by modules for weighting digital signals located in the antenna unit;

configuring at least one weighting coefficient in the modules for weighting digital signals based on the information received at the antenna unit; and

applying respective weighting coefficients to digital signals in each of the modules for weighting digital signals, said weighting coefficients determining the radiation characteristics of the antenna.

69. (New) The method as claimed in claim 68 further comprising:

replicating a digital signal to generate a plurality of digital signals; and

distributing each of the generated digital signals to a different module for weighting digital signals.